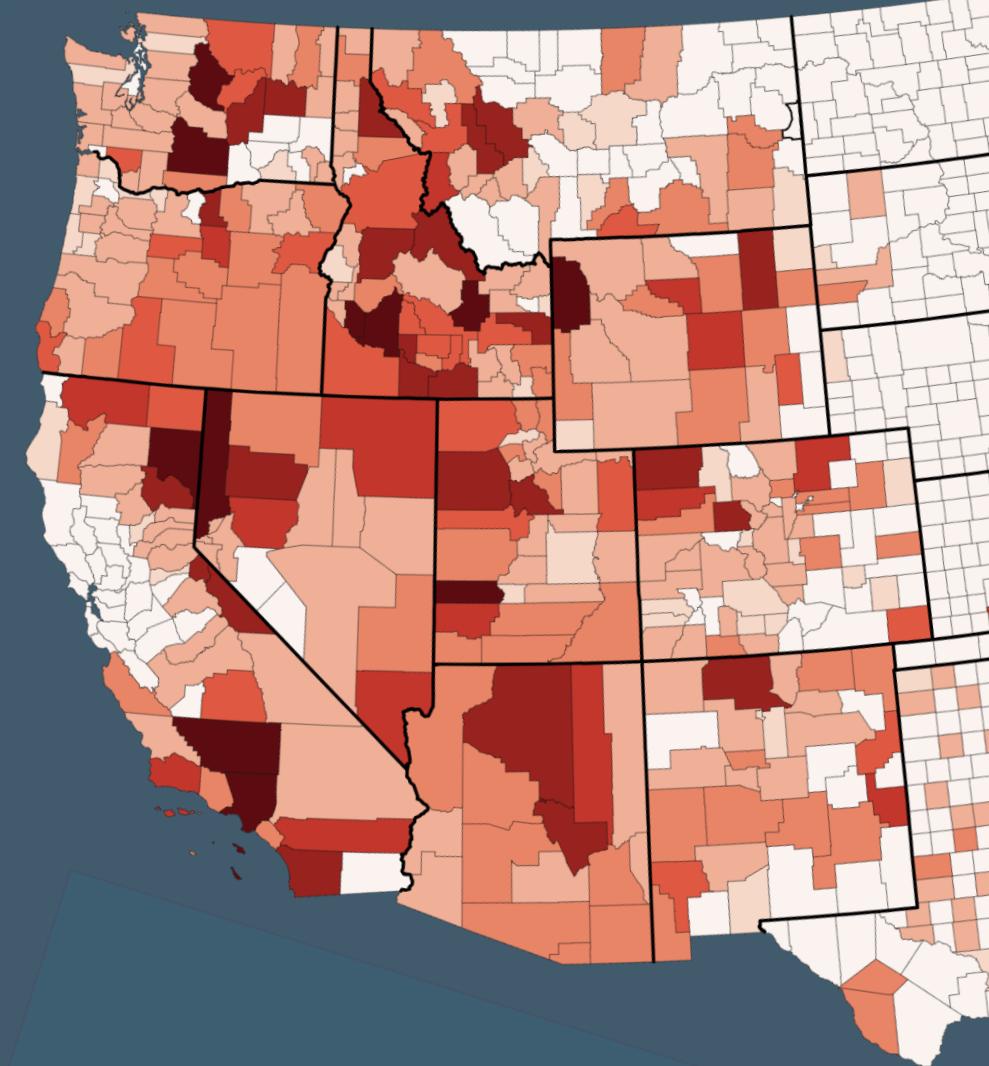


# Inferno Across America: A Visual Chronicle of Wildfires

Topic 1: Cycles



# Forest Fires Brainstorm

- Trends over Time
- Seasonal Patterns
- Regional Comparison
- Causes and Contributors
- Impact and Damage
- Wildfire Size and Duration
- Public Response and Awareness



# Forest Fires Brainstorm

- Trends over Time
- Seasonal Patterns
- Regional Comparison
- Causes and Contributors
- Impact and Damage
- Wildfire Size (bonus)
- Public Response and Awareness



# Dataset: 1.88 Million US Wildfires

FIRE\_YEAR: Year

FIRE\_SIZE\_CLASS: Grade

DISCOVERY\_DATE: Julian Date

COUNTY: State Number

FIRE\_SIZE: Acres

FIPS\_CODE: County Number

FIRE_YEAR	DISCOVERY_DATE	STAT_CAUSE_CODE	STAT_CAUSE_DESCR	CONT_DATE	FIRE_SIZE	FIRE_SIZE_CLASS	LATITUDE	LONGITUDE	STATE	COUNTY	FIPS_CODE
Filter	Filter	Filter	Filter	Filter	Filter	Filter	Filter	Filter	Filter	Filter	Filter
2005	2453543.5	1.0	Lightning	2453551.5	3000.0	F	33.675	-111.35	AZ	13	013
2006	2453874.5	1.0	Lightning	2453875.5	3.9	B	35.94944444	-106.82138889	NM	43	043
2006	2453765.5	9.0	Miscellaneous	2453766.5	0.1	A	34.14361111	-110.50361111	AZ	7	007
2006	2454002.5	9.0	Miscellaneous	2454003.5	0.1	A	47.45916667	-121.2725	WA	37	037
2006	2453917.5	7.0	Arson	2453918.5	12.8	C	31.30666667	-90.95583333	MS	5	005
2006	2453917.5	7.0	Arson	2453918.5	2.3	B	31.33333333	-90.93972222	MS	5	005
2006	2453917.5	7.0	Arson	2453918.5	1.6	B	31.33444444	-90.94638889	MS	5	005
2006	2453917.5	7.0	Arson	2453918.5	4.6	B	31.33611111	-90.95277778	MS	5	005
2006	2453917.5	7.0	Arson	2453918.5	1.1	B	31.33722222	-90.95583333	MS	5	005

# Extracting Data

FIRE\_YEAR  
DISCOVERY\_DATE  
FIRE\_SIZE  
FIRE\_SIZE\_CLASS  
COUNTY  
FIPS\_CODE



```
SELECT
CASE STATE
WHEN 'AL' THEN '01'
.....
WHEN 'WY' THEN '56'
ELSE NULL
END || fips_code AS County_Id,
strftime('%Y', DISCOVERY_DATE) AS Year,
strftime('%m', DISCOVERY_DATE) AS Month,
SUM(FIRE_SIZE) AS Fire_Size
FROM Fires
WHERE County_Id IS NOT NULL
GROUP BY County, Year, Month
ORDER BY Year, Month
```

A large, stylized logo for JSON, consisting of the word "JSON" in a bold, green, sans-serif font, with the letter "J" partially colored in orange.

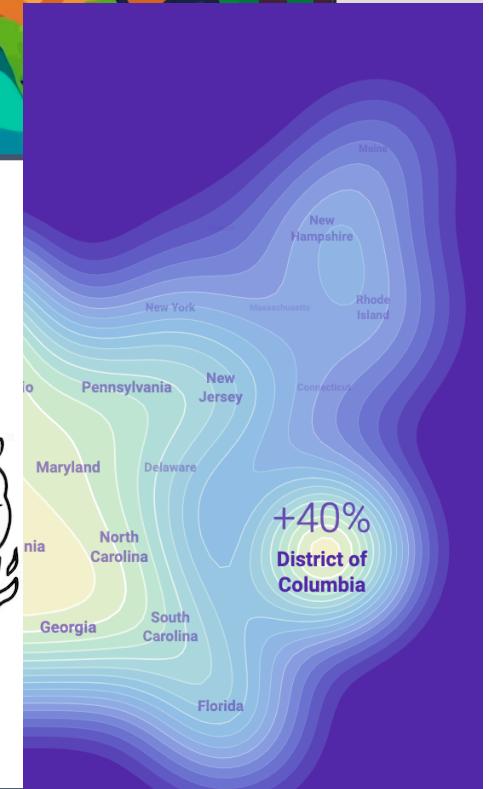
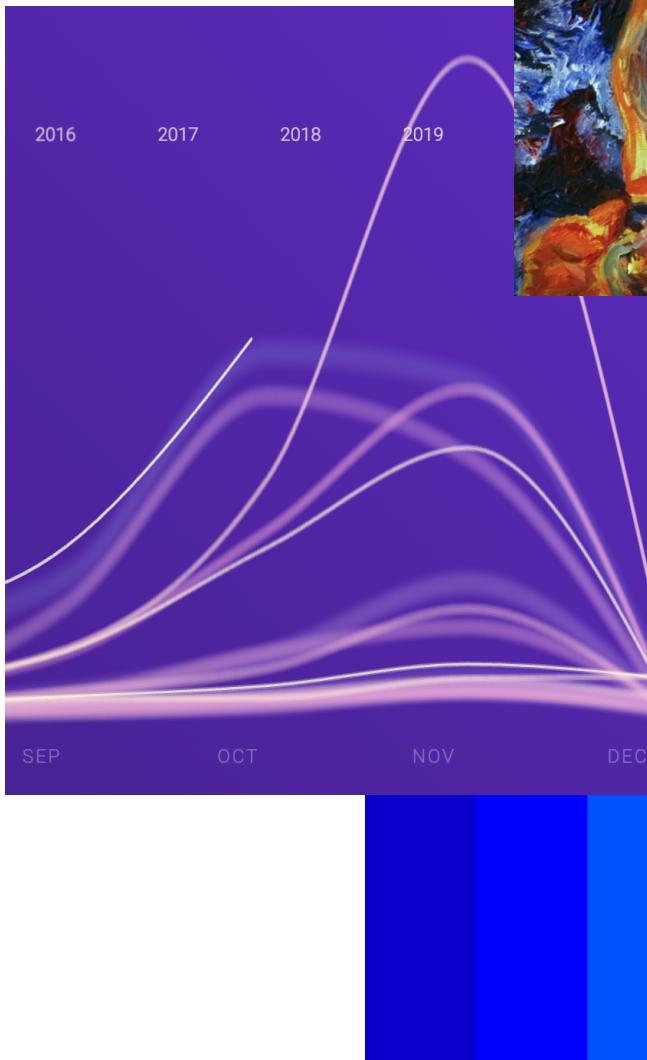
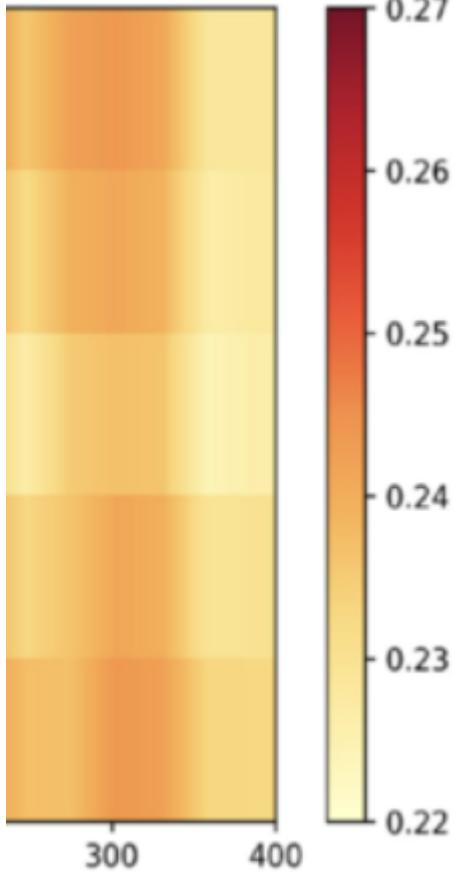
```
{"County_Id": "12049", "Fire_Size": 789.8, "Month": "01", "Year": "1992"},  
{"County_Id": "12051", "Fire_Size": 2.2, "Month": "01", "Year": "1992"},  
{"County_Id": "12053", "Fire_Size": 37.8, "Month": "01", "Year": "1992"},  
{"County_Id": "12055", "Fire_Size": 158.0, "Month": "01", "Year": "1992"},  
{"County_Id": "12057", "Fire_Size": 360.0, "Month": "01", "Year": "1992"},  
{"County_Id": "12059", "Fire_Size": 12.6, "Month": "01", "Year": "1992"},  
{"County_Id": "12061", "Fire_Size": 390.2, "Month": "01", "Year": "1992"},  
{"County_Id": "12063", "Fire_Size": 7.1, "Month": "01", "Year": "1992"},  
{"County_Id": "12065", "Fire_Size": 101.2, "Month": "01", "Year": "1992"},  
{"County_Id": "12067", "Fire_Size": 11.3, "Month": "01", "Year": "1992"},  
{"County_Id": "12069", "Fire_Size": 1329.0, "Month": "01", "Year": "1992"},  
{"County_Id": "12071", "Fire_Size": 32.5, "Month": "01", "Year": "1992"},  
{"County_Id": "12073", "Fire_Size": 24.6, "Month": "01", "Year": "1992"},  
{"County_Id": "12075", "Fire_Size": 144.1, "Month": "01", "Year": "1992"},  
{"County_Id": "12079", "Fire_Size": 32.0, "Month": "01", "Year": "1992"},  
{"County_Id": "12081", "Fire_Size": 254.3, "Month": "01", "Year": "1992"},
```

We extracted a subset of the original dataset using SQL, which we then converted into JSON.

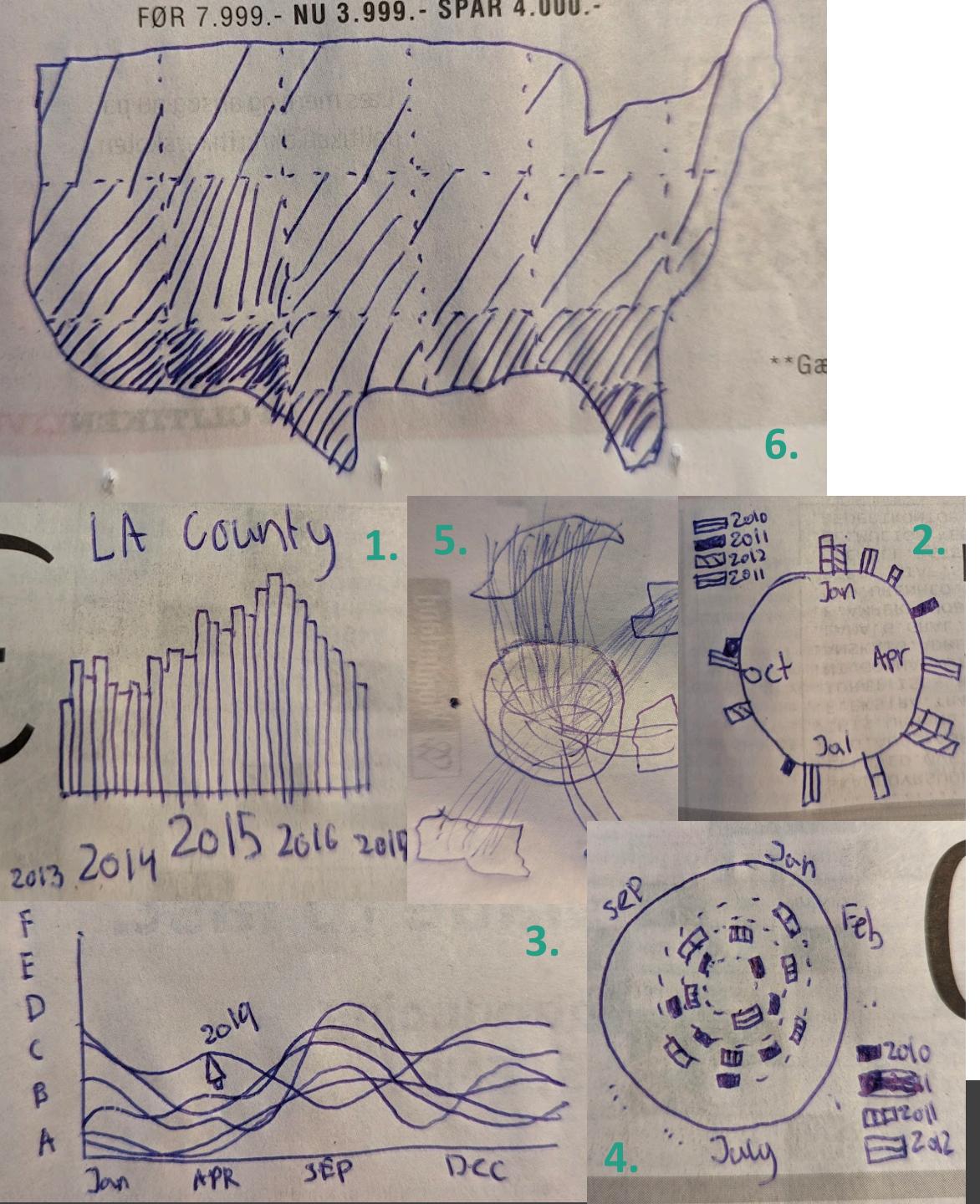
Our two datasets:

- FiresPerCountyMonthly.json
  - Contains total wildfires in each US county per month
- FiresUSMonthly.json
  - Contains total wildfires in the whole US per month.

# Moodboard



FØR 7.999.- NU 3.999.- SPAR 4.000.-

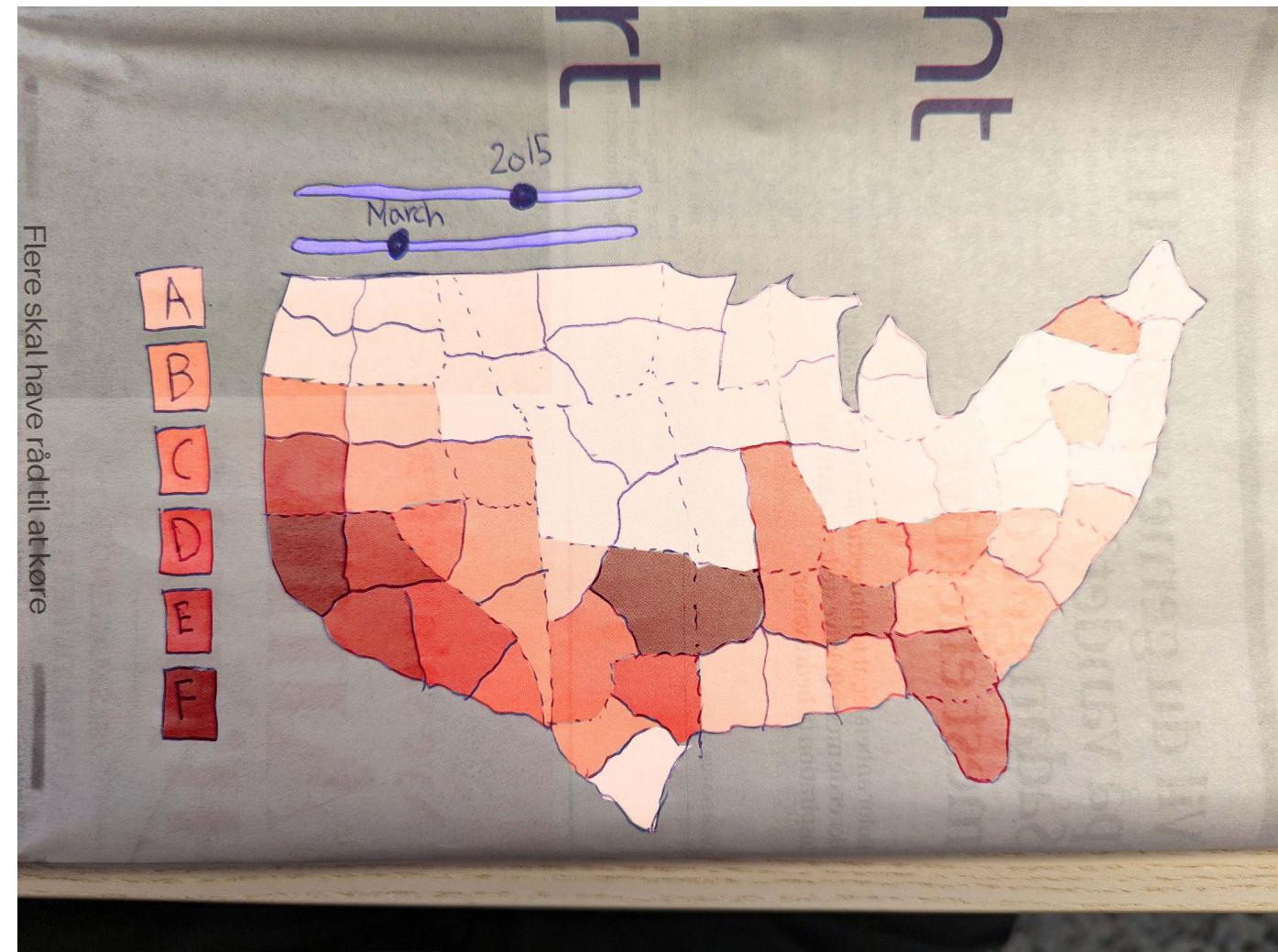


## Sketches

- Sketch 1
  - Requires 1 visualization for each area
  - Difficult to compare
- Sketch 2, 3 & 4
  - Can't see specific areas
- Sketch 5
  - Difficult to communicate
- Sketch 6
  - Easy to see areas

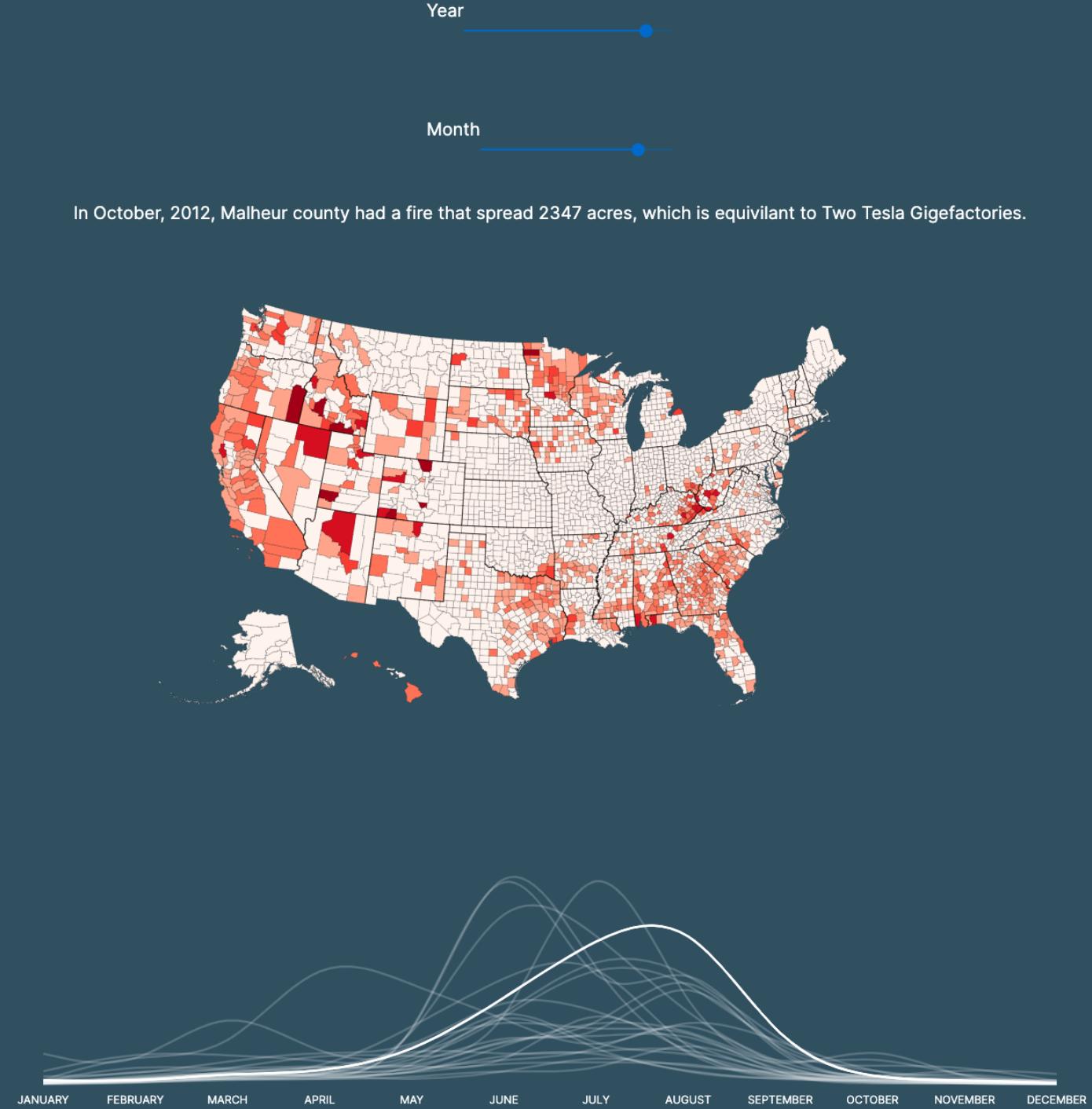
## Final Sketch

- Divided into areas
- Easy to see compare different years
- Easy to see fire class
- Visualization
  - Explore
  - Audience
  - Interactive website



# MVP Demo

- Kept two visualizations
- Added line graph
- Added fun facts
- To do list:
  - Add a legend
  - Add title, description
  - Add new layout
  - Make line graph interactive
  - Add data source explanation
  - Fix bugs



# Code - Draw Counties

- React w/ D3
- State management
- D3 inside HTML

```
const [currentWildFireData, setCurrentWildFireData] = useState([]);  
return (  
  <svg height={500} width={1000}>  
    <g fill="none" stroke="none" strokeLinejoin="round" strokeLinecap="round">  
      {currentWildFireData.map((county) => {  
        const color = county.fireSize == 0 ? "#fff5f0" : reds(getFireValue(parseInt(county.fireSize)));  
        return (  
          <County key={county.id} color={color} d={geoPath(county)} county={county} countyClicked={countyClicked} />  
        );
      })
    </g>
  </svg>
);
```

```
export default function County({ d, county, color, countyClicked }) {  
  const [hover, setHover] = useState(false);  
  const [currentColor, setCurrentColor] = useState(color);  
  
  useEffect(() => {  
    setCurrentColor(color);  
  }, [color]);  
  
  return (  
    <>  
      <motion.path  
        stroke="black"  
        strokeWidth={`${hover ? "1" : "0.1"}`}  
        fill={currentColor}  
        d={d}  
        onMouseLeave={() => {  
          setHover(false);  
        }}  
        onMouseEnter={() => {  
          setHover(true);  
        }}  
        onClick={() => {  
          countyClicked(county);  
        }}  
        animate={({  
          fill: currentColor,  
        })  
        transition={({  
          duration: 0.4, // Total duration of the transition // Duration of scale animation  
        })  
      />  
    </>  
  );  
}
```

# **Biggest struggles**

## **Design aspect:**

- **Focusing on the message**
  - We had many fun ideas that we wanted to implement, but we had to restrict us to ensure our message was strong and not confusing.
- **Fitting everything into one screen**
  - It was difficult to create a layout that has all information on one screen. We ended up with a design that works in 14" screens and up.

## **Code aspect:**

- **Performance**
  - Performance was our biggest struggle throughout the project. We improved it mostly by:
    1. Taking all irrelevant information out of our dataset to trim it down in size (org filesize was 1.7gb).
    2. Sorting our data into a map data structure at first load, so we don't have to iterate through the entire json file everytime a new time period has been selected.
  - Website could still be a lot faster, but we decided to focus more on adding new features from our given feedback.

# Feedback from class presentation

- Add search option
  - One suggestion was to make it easier for our audience to find their own county by adding a search feature.
- Add image to fact text
  - Another fun suggestion was to add images of the different geographical locations that matches the fire sizes
- Make the message more clear
  - One thought it was a bit unclear what our visualization was due to lack of legends and textual descriptions.
- Add y-axis to line graph
- Separate month and year slider



# New changes (1/2)

- County Search
  - Searching a county will show the fact text that indicates how big a fire was for that county.
- State labels
  - We added a toggle to see the names of all states to help compare areas.
- Image to fact text
  - Hovering the image icon in the fact text will show a photo of the compared geographical location
- Make the message more clear
  - We added a description text to our visualizations, a legend for the color scale and a information icon that reveals a graph explanation on mouse hover.



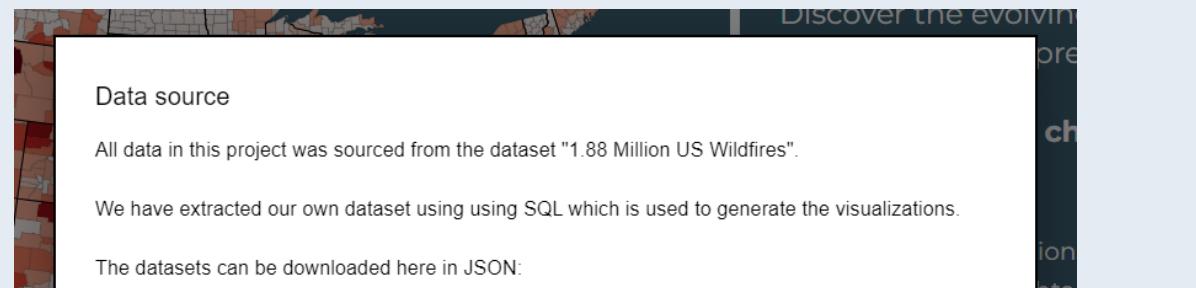
## New changes (2/2)

- Y-axis to line graph
  - We added a y-axis that indicates how many acres was burned in total.
- Separate month and year slider
  - We separated the year slider and month slider so they aren't stacked on top of each other. We also added a text so it's easy to see year and month selected.
  - When flipping the line graph toggle, the sliders will switch place to match the x-axis.
- Data source
  - We added a data source button which will explain our dataset and gives links to the original dataset and our own extracted datasets.



In July of 2010, there was a fire outbreak in Uintah county, which covered an expanse of 128.3 acres, mirroring the area of Venice Beach.

Selected Month: **July**



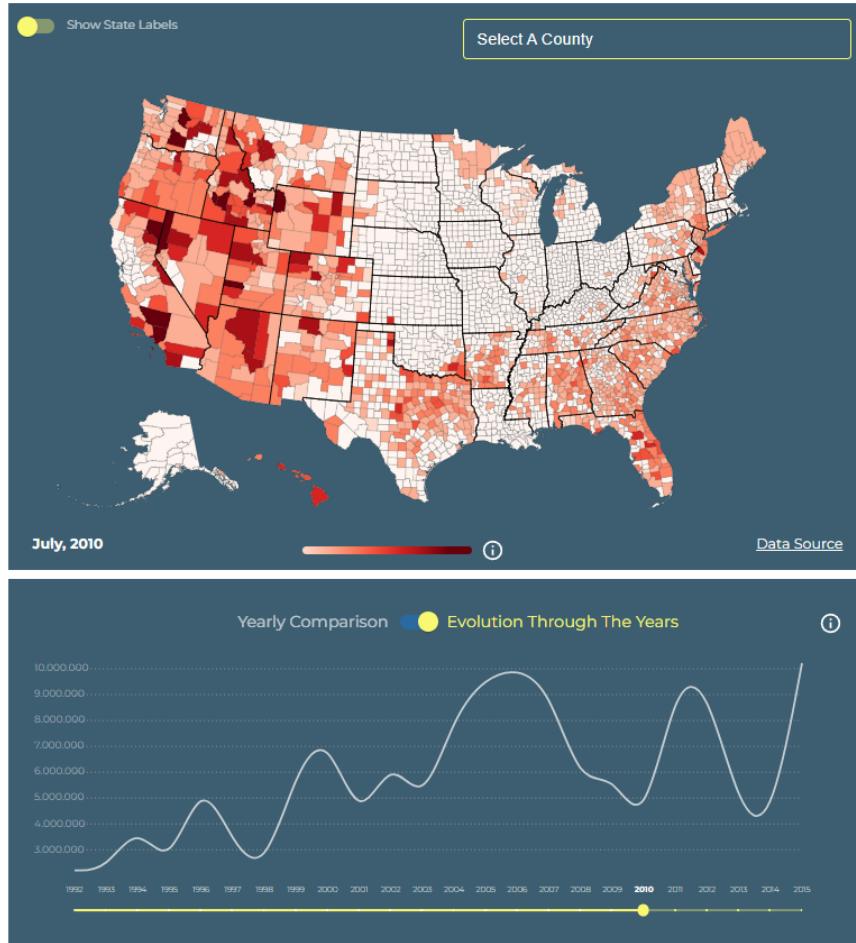
# Final project

Can be run in two ways:

1. Visualization is live on:

<https://cdv-project.vercel.app/>

- I. Can be run within project files (please see `readme.txt` for instructions).



## Inferno Across America: A Visual Chronicle of Wildfires

Discover the evolving history of US wildfires and the pressing question:

**How has climate change impacted these infernos?**

Uncover the connections between rising temperatures, droughts, and increased wildfire incidents. Join us on a quest for understanding and action to protect our landscapes from this growing threat.

In July of 2010, there was a fire outbreak in Uintah county, which covered an expanse of 128.3 acres, mirroring the area of Venice Beach.

Selected Month: **July**